BROILER CHICKEN: THE COMPARATIVE-EVALUATIVE ANALYSIS OF THE MANUAL SLICING TECHNOLOGY

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ABSTRACT

The production of poultry meat of the world rises dynamically with 3-4 per cent annually. The reason of this fact is the growth of population and the changing of the customers' habit. It is because of the fact that in the relatively affordable price of poultry meat on the other hand in the changes in the society. Manual cut techniques already are not able to fulfil the requirements at the higher market demands. In the 1980s the volume of poultry cuts has grown considerably due to the development of automatic cutting machines.
In our essay we compared the manual tapered cut and the STORK ACM MX NT cut up system. The aim was to focus on the conformation of main products, parallel products and the wastage of cut.

1. INTRODUCTION

In recent years the demand for cut meat products of all poultry species has increased sharply due to the change of consumer needs and attitudes. This significant trend has occurred both in the export product choice and the domestic demand.
The productivity of the portioning lines - due to the fact that manual slicing was the exclusively applied method - was very small until the beginning of the 1980s. The introduction of mechanical slicing allowed us to meet the domestic and export demand for cut meat products. Today, cut meat products are a significant proportion of the product structure at the majority of poultry processing plants.
By slicing we generally mean the separation of the poultry into anatomical body parts (leg, breast, etc.). The exclusive application of manual operations is rather tiring, long and hard physical work, therefore its mechanization has become necessary in recent years. Nowadays, up-to-date machines, equipment, even complete lines are used by the industry for slicing different kinds of meat but mostly poultry.
During our experiments we compared two slicing techniques or technologies with regard to the economic yield of the principal products mostly, and at the same time we evaluated the quantitative development of the resulting parallel products, too.

2. MATERIALS AND METHODS

During our experiments we compared the principal and parallel product yield of poultries sliced with a traditional manual technology plus a cone line feeder and by a STORK (Dutch) ACM MX NT portioning equipment. We certainly examined the development of the resulting losses as well.
We made the measurements on Ross 208 type poultry species belonging to the three weight classes most frequently needed by consumers: poultries of 1200, 1300 and 1400 g. We used variation analysis statistical method to examine the effect of the slicing method on the yield. We made the calculations using the ANOVA menu item of the Statistica 8.0 programme suite. On Fig. 1., 2., 3. and 4. we show in grams the mean values of yield for

the leg, breast, wing and backs body parts of poultries with 1200-1400 g grill weight, and with significant difference values belonging to the significance level p=0.005. On Fig. 5., 6. and 7. we show the yield percentage of the same body parts for the two slicing methods in terms of the grill weight.

3. RESULTS AND DISCUSSION

We used the variation analysis statistical method to examine the effect of the slicing method on yield. We made the calculations using the ANOVA menu item of the Statistica 8.0 programme suite. On Fig. 1., 3., 5. and 7. - for the detailed examination of the variation analysis results - we show in grams the mean values of yield for the leg, breast, wing and backs body parts of poultries with 1200-1400 g grill weight, and with significant difference values belonging to the significance level p=0.005. On Fig. 2., 4., 6. and 8. we show the yield percentage of the same body parts for the two slicing methods in terms of the grill weight.

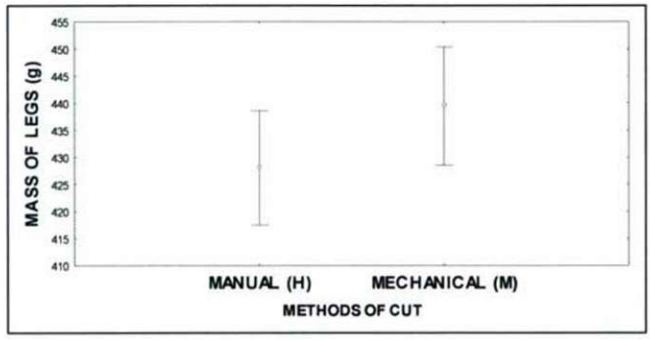


Fig. 1. The effect of the slicing method on the leg mass yield

Fig. 1. shows that with mechanical slicing we obtained a leg mass with plus 13 grams on average, however, according to the results of the variation analysis this difference is not significant (p=0.13). The same is true for the leg mass yield expressed as a percentage (Fig. 2.).

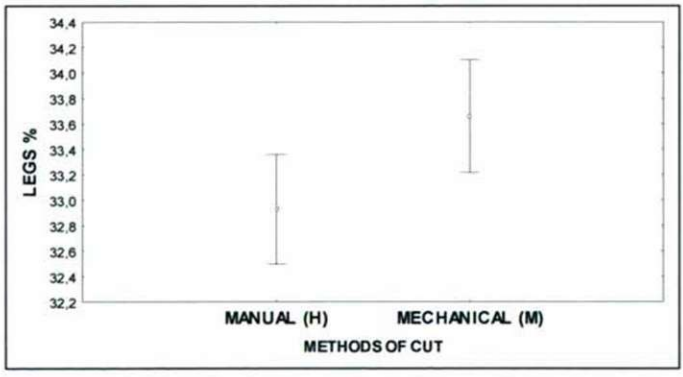


Fig. 2. The effect of the slicing method on the leg mass yield percentage

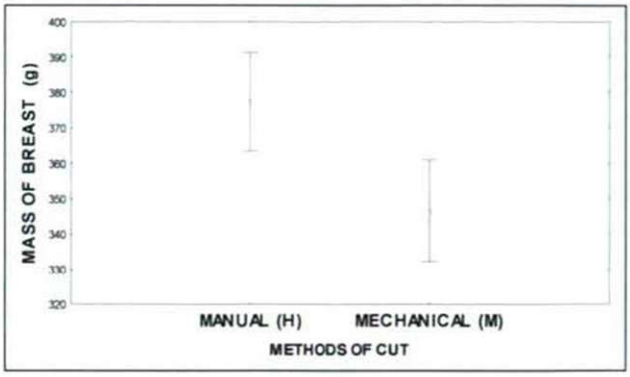


Fig. 3. The effect of the slicing method on the breast mass yield

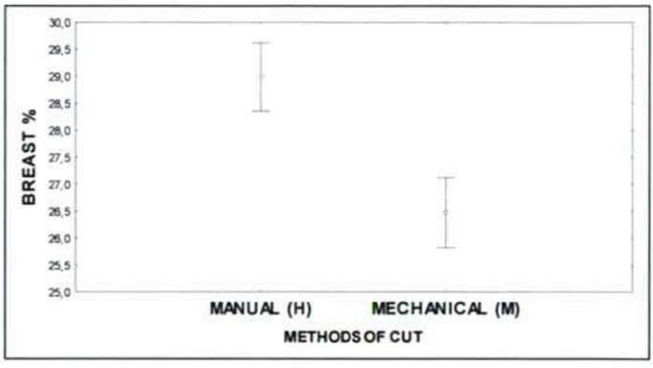


Fig. 4. The effect of the slicing method on the breast mass yield percentage

The results on Fig. 3. and 4. show that the mechanical slicing method produces a breast yield that is significantly smaller, with 30 grams (2.5%) on average, in comparison to manual slicing.

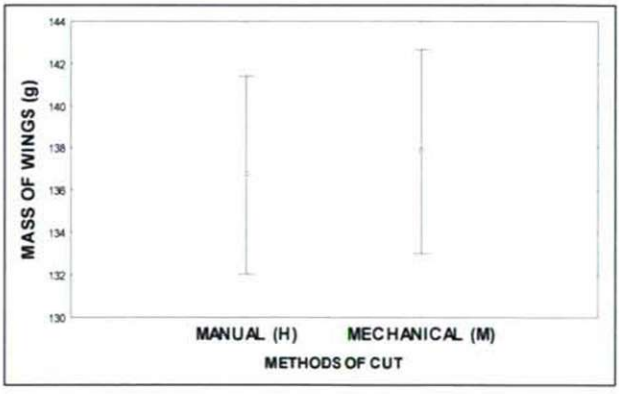


Fig. 5. The effect of the slicing method on the wing mass yield

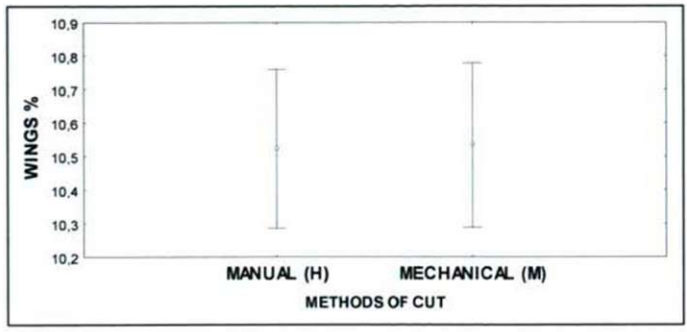


Fig. 6. The effect of the slicing method on the wing mass yield percentage

Fig. 5. and 6. show that the wing mass yield is not affected by the slicing method. There is no significant difference between the average values of wing mass obtained using the two methods.

On Fig. 7. 8. we can see the comparison of the backs yield obtained by the manual and the mechanical technology.

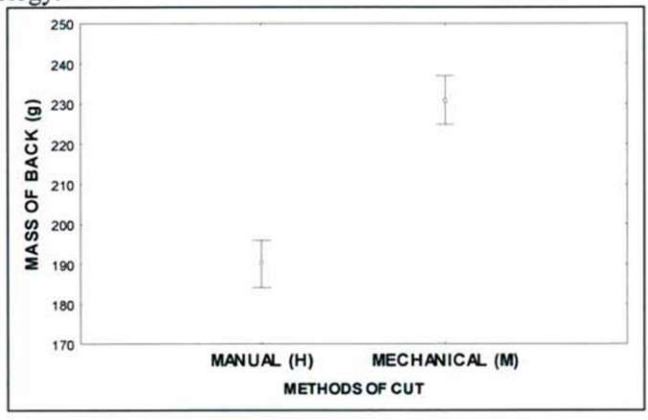


Fig. 7. The effect of the slicing method on the backs mass yield

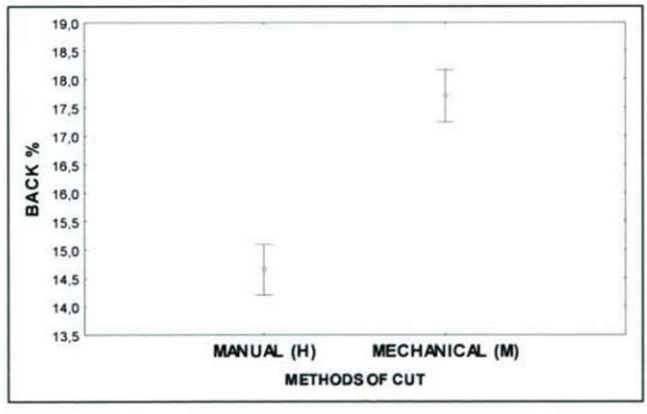


Fig. 8. The effect of the slicing method on the backs mass yield percentage

The result of the variation analysis shows that the backs yield is significantly greater with the mechanical slicing method than with the manual one. We obtained a backs mass yield that was greater, with 40 grams or 3% on average, when we applied the mechanical slicing method.
The backs mass surplus we had with mechanical slicing was parallel to the breast mass shortage we had with the same method.
We examined in detail the effect of the manual and mechanical slicing on yield establishing grill weight categories. Fig. 9.-10. show the effect of the slicing method on the mass yield percentage of the different body parts for chickens of 1200, 1300 and 1400 g grill weight by weight category.

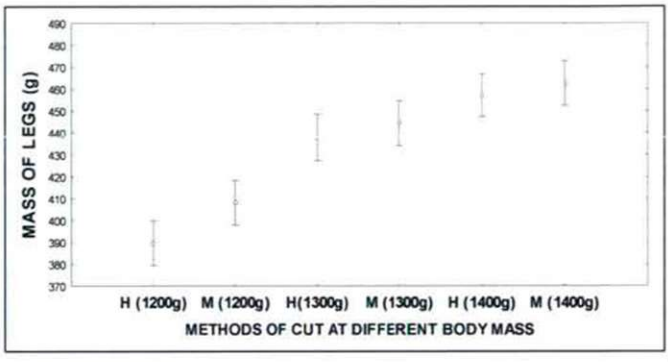


Fig. 9. The effect of the slicing method on the leg mass yield by grill weight category

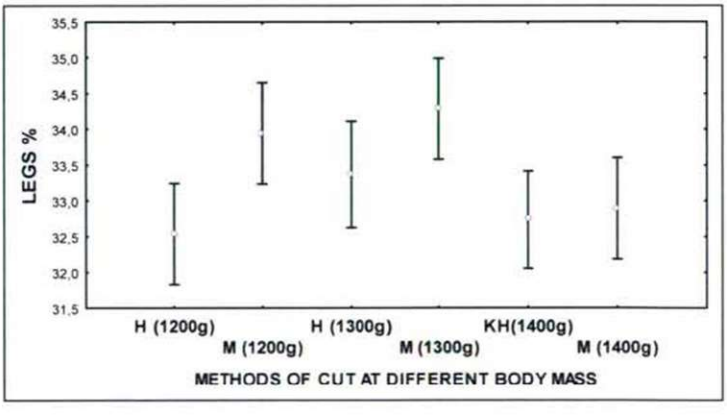


Fig. 10. The effect of the slicing method on the leg mass yield percentage by grill weight category

Fig. 8. and 9. show that in case of the 1220 g grill weight, mechanical slicing produces a significantly greater leg mass yield, plus 20 grams or 1,5%, than manual slicing. There is no significant difference of the leg mass yield in case of the bigger, 1300 and 1400 g grill weight categories with regard to the slicing method.

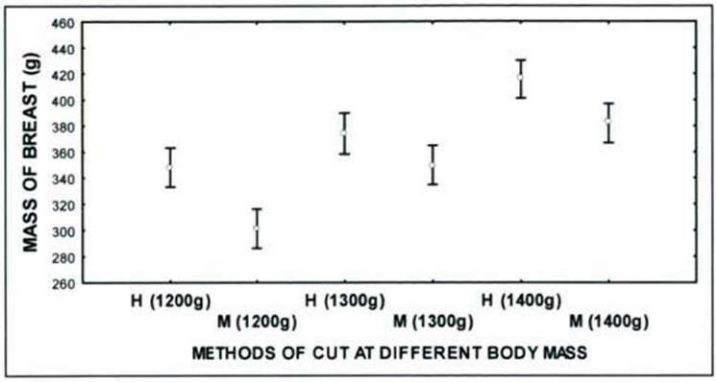


Fig. 11. The effect of the slicing method on the breast mass yield by grill weight category

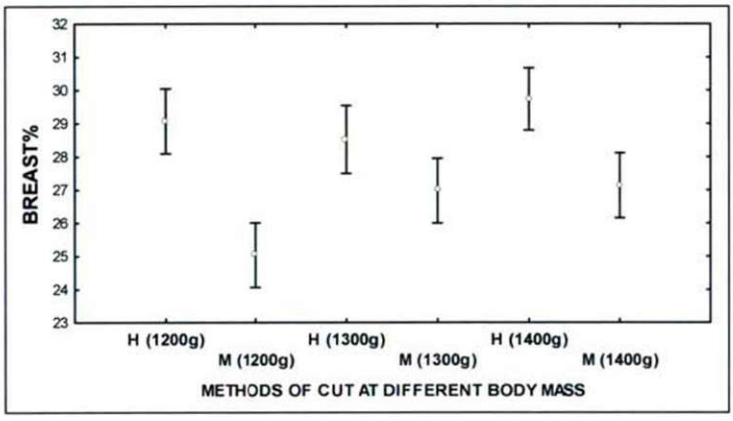
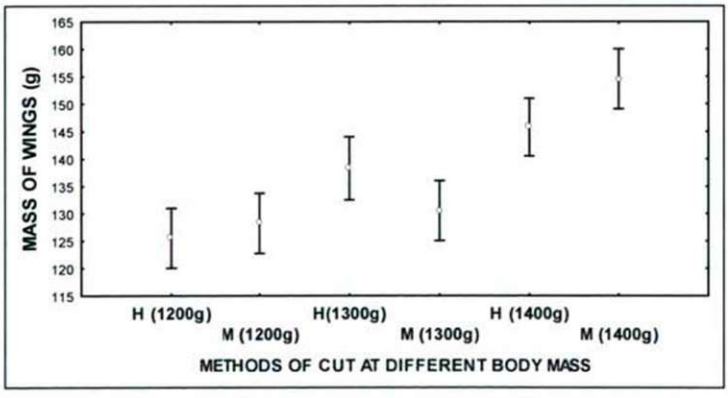


Fig. 12. The effect of the slicing method on the wing mass yield percentage by grill weight category

Fig. 11. and 12. indicate that the breast mass yield is significantly smaller with mechanical slicing than with the manual method in all three grill weight categories. We can also see that with the same slicing method (manual or mechanical) the breast mass yield is significantly greater in the bigger grill weight categories.



13. The effect of the slicing method on the wing mass yield by grill weight category

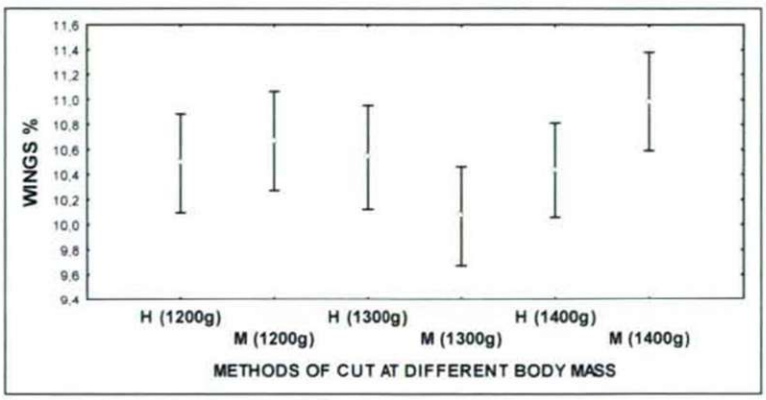


Fig. 14. The effect of the slicing method on the wing mass yield by grill weight category

Fig. 13. and 14. show that the slicing method has no significant effect on the wing yield at any of the grill weight categories.

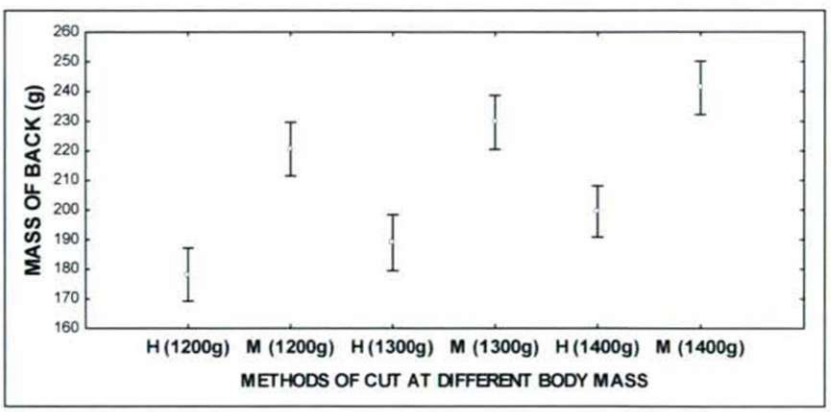


Fig. 15. The effect of the slicing method on the backs yield by grill weight category

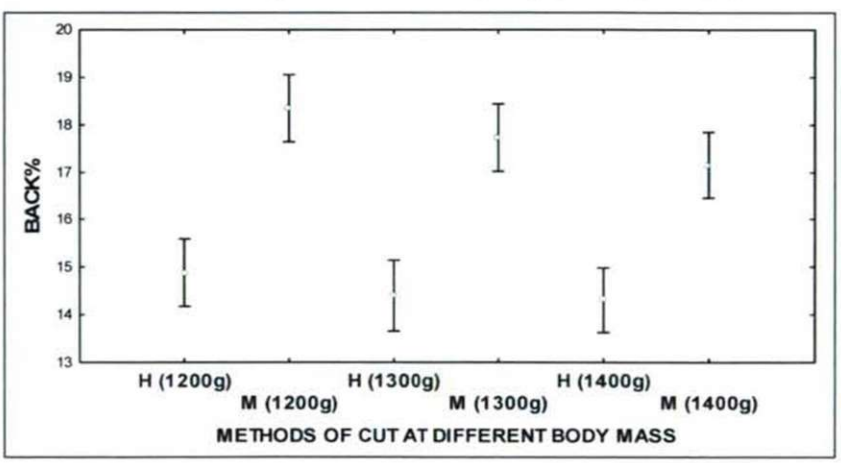


Fig. 15. The effect of the slicing method on the backs yield percentage by grill weight category

The results of the variation analysis show that (Fig. 15., 16.) mechanical slicing produces a significantly greater backs yield at all grill weight categories.

4. CONCLUSION

In conclusion, we can say that the variation analysis showed us that - with respect to the method of slicing - we can obtain a greater leg yield percentage if we apply mechanical slicing. Unfortunately, however, in case of the breast part we have to make an opposite finding: according to this, mechanical slicing produced a significantly smaller breast yield percentage. It is probable that in this case the quantity missing from the breast was cut to the backs part by the slicing machine, which can mean a significant loss to the processing plant due to its lower price.
In this case it is probable that the machine has adjusting problems, which has to be corrected by the technicians by all means. Anyway, this slicing problem occurred in all three weight categories.

5. REFERENCES

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